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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,624	06/24/2005	Masato Honma	IPE-057	7137

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EXAMINER	
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ART UNIT	PAPER NUMBER
1785	

MAIL DATE	DELIVERY MODE
12/22/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,624	HONMA ET AL.	
	Examiner	Art Unit	
	GERARD T. HIGGINS	1785	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5-8 and 11-39* is/are pending in the application.

4a) Of the above claim(s) *14,15,18 and 21-38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5-8,11-13,16,17,19,20 and 39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 10/22/2010 has been entered.

Response to Amendment

2. The amendment filed 10/22/2010 has been entered. Currently claims 1, 3, 5-8, and 11-39 are pending, claims 2, 4, 9, and 10 are cancelled, and claims 14, 15, 18, and 21-38 are withdrawn from consideration.

Claim Objections

3. Claims 3, 5, 6, 8, 11-13, 17, 19, and 20 are objected to because of the following informalities:

In claims 3, 5, 6, 8, and 11-13, the phrase “A layered product” on the first line of each claim is objected to grammatically. This objection can be overcome by changing

the phrase to "The layered product" in each claim, which is how the claims will be interpreted.

In claims 17, 19, and 20, the phrase "An integrated molded object" on the first line of each claim is objected to grammatically. This objection can be overcome by changing the phrase to "The integrated molded object" in each claim, which is how the claims will be interpreted.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. Claim 39 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regard to claim 39, the phrase "(g) a distance between the maximum innermost filament in said filaments in the resin of said thermoplastic resin layer in the thickness direction thereof and the minimum innermost filament is 10 μm or more" does not find support in the specification as originally filed. The Examiner notes that this language attempts to draw support from page 25, line 6 to page 26, line 4; however, applicants do not ever define the distance between the maximum innermost filament and the minimum innermost filament. The distance of 10 μm or more is supported when

referring to the distance "Tpf-max" which is the distance between the maximum innermost filament and the outermost filament of the thermoplastic resin layer.

This rejection could be overcome by changing the limitations to recite "(g) a distance between the maximum innermost filament in said filaments in the resin of said thermoplastic resin layer in the thickness direction thereof and an outermost filament is 10 μm or more". This rejection could also be overcome by changing the limitations to recite "(g) a distance between the maximum innermost filament in said filaments in the resin of said thermoplastic resin layer in the thickness direction thereof and the minimum innermost filament is 10 to 30 μm". These limitations would find support from Examples 1-3 and 1-7 for a 10 μm difference and Example 1-5 for a 30 μm difference.

5. Claim 39 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 recites the limitation "the region" the 22nd line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection can be overcome by deleting the phrase "in the region" which is how the claim will be interpreted.

Claim Rejections - 35 USC § 102

6. Claims 1, 3, 5, 6, 8, 11-13, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Obara (JP 07-047152) as evidenced by applicants' own admissions.

With regard to claims 1 and 5, Obara teaches Comparative Example 2 at [0026] which is produced in the same way as Example 3 except for the use of maleic acid modified polypropylene resin. This results in the formation of a "clear interface" between the thermosetting layer and the thermoplastic layer as taught by Obara and admitted by applicants [0026]. As evidenced by applicants' declaration filed 10/22/2010, pictures T4 and T5 are pictures of said clear interface.

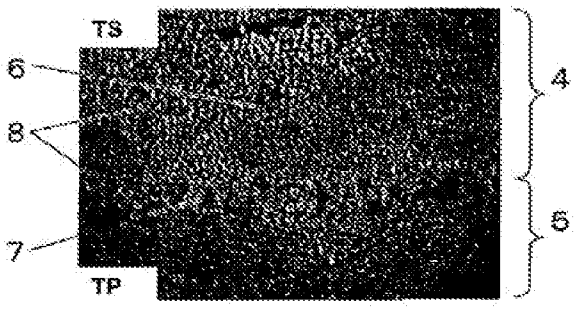

Figure T4

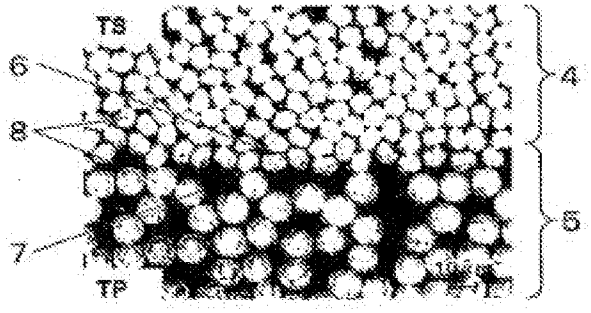

Figure T5

Judging by these pictures, the clear interface would read on applicants' continuous rugged interface; furthermore, judging by the scale in T5 it is inherent to this device that the distance between the outermost reinforcing continuous filament and the innermost reinforcing continuous filament will be 10 microns or more as claimed.

With regard to claim 39 and the limitation that the "a distance between the maximum innermost filament in said filaments in the resin of said thermoplastic resin layer in the thickness direction thereof and the minimum innermost filament is 10 μm or more", judging again by the scale in Figure T5 and pending a clearer photograph, there is sufficient evidence to conclude that the distance between the maximum and minimum innermost filaments is 10 μm or more.

With regard to claims 3 and 12, Obara teaches at [0023] and [0026] that epoxy resin is preferred as the thermosetting resin of the Comparative Example 2. Epoxy resins will inherently have a glass transition temperature of 60 ℃ or greater.

With regard to claim 6, since the racket frame is formed as a tube comprising joined thermosetting and thermoplastic layers, and that the layers may be formed in any order [0014] and [0026]; it is clear that the thermoplastic layer may comprise the inner layer/surface of the frame, and therefore that would lead it to inherently have a surface area between 0.1 and 50% of the total surface area. This is true because the outer layer of the racket frame would have a greater surface area than the inner layer, and since the total surface area of the frame must be the sum of the surface areas of the inner and outer layers; it would necessarily be true that the inner layer must have a surface area between 0.1 and 50%.

With regard to claim 8, considering the fact that these materials are the same and the bonding interface is the same; a test piece formed from the Comparative Example 2 as in the same manner of applicants test piece would inherently possess the bonding strength claimed.

With regard to claim 11, Obara teaches that Comparative Example 2 uses carbon fiber [0023] and [0026].

With regard to claim 13, Obara teaches at [0021], [0023], and [0026] that a polyester resin is used as the thermoplastic resin in Comparative Example 2.

Claim Rejections - 35 USC § 102/103

7. Claims 1, 3, 5, 6, 8, 11-13, 16, 17, 19, 20, and 39 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Evans et al. (4,604,319).

With regard to claims 1 and 39, Evans et al. disclose the composite **24** of Figure 3.

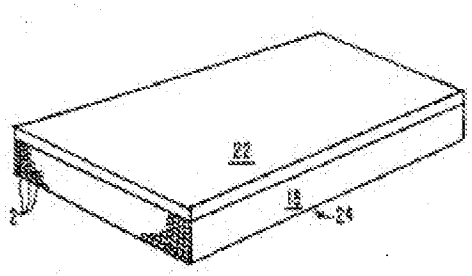

FIG. 3

The composite is comprised of a fiber resin matrix **18** comprising a thermosetting resin and reinforcing filaments **2**, which reads on applicants' thermosetting resin layer and reinforcing continuous filaments arranged in one direction, and also a layer of interleaf material **22** comprised essentially of a thermoplastic resin, which reads on applicants' thermoplastic resin layer (col. 4, line 29 to col. 5, line 7). The composite is made by first forming a prepreg of the filaments in the thermosetting resin and then placing a layer of the thermoplastic resin onto the prepreg. The composite is then cured, for example, at 350 °F and 100 psi, wherein 100 psi is approximately 0.7 MPa (col. 9, lines 27-28).

Given the fact that the Examiner has provided a layered composite identical to that claimed, which has been prepared at a pressure that is analogous to applicants'

preferred pressure (page 9, lines 7-11) and using thermoplastic and thermosetting resins that are among applicants' preferred resin (page 8, lines 14-22), the Examiner deems that the composite of Evans et al. will inherently possess the continuous rugged interface region claimed, including a portion of filaments that exist in both the thermosetting and thermoplastic resin layers.

With regard to the limitations in claim 1 that “the thickness of the area in said thermoplastic resin layer between the outermost reinforcing continuous filament with respect to the second opposed surface of the thermoplastic resin layer and an innermost reinforcing continuous filament with respect to the second opposed surface of the thermoplastic resin layer is 10 μm”, the Examiner notes that the thermoplastic interleaf layer of Evans et al. may be as thick as 50 μm (col. 9, line 67 to col. 10, line 3). Also, using the same rationale as provided above concerning the "continuous rugged interface," the Examiner deems that the composite of Evans et al. having a thermoplastic interleaf layer of 50 μm will inherently possess the reinforcing filaments **2** in at least a 10 μm thickness region as claimed.

With regard to claim 39 and the limitation that "a distance between the maximum innermost filament in said filaments in the resin of said thermoplastic resin layer in the thickness direction thereof and the minimum innermost filament is 10 μm or more”, given the fact that Evans et al. discloses the same materials molded in a similar manner as disclosed by applicant; the layered product of Evans et al. will inherently posses a distance between the maximum and minimum innermost filaments of 10 μm or more as claimed.

Alternatively, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have varied the temperature and pressure conditions under which this composite was made to any amount in order to allow the reinforcing filaments **2** of the fiber resin matrix **18** to penetrate into the thermoplastic interleaf material **22** to any depth, including the at least 10 μm as claimed. The rationale behind this is that these reinforcing filaments would provide sturdiness to the laminate, and it would have been obvious to one having ordinary skill in the art to determine the penetration thickness wherein the laminate would exhibit the best properties, e.g. shear modulus, bonding strength, compression strength, etc., while not have the fibers being exposed on the surface of the thermoplastic layer. This is mere experimental optimization to optimize the aforementioned properties.

With regard to claim 3, Evans et al. state that their composite has unique toughness, shear resistance, etc. up to 270 °F, which is 132 °C (col. 3, lines 22-29). This means that the resins used for the thermosetting layer will inherently have to have a glass transition temperature higher than 132 °C or the composite would melt/deform, and therefore the composite would not possess the unique properties disclosed.

With regard to claim 5, given that the maximum thickness of the thermoplastic layer is 50 μm and the Examiner has either inherently or alternatively rendered obvious the limitation wherein the reinforcing filaments are in a thickness area greater than 10 μm, the limitations of this claim have been met.

With regard to claim 6, it is clear from at least Figure 3 and the thicknesses of the thermoplastic and thermosetting layers at col. 10, lines 1-3 that the thermoplastic layer accounts for between 0.1 to 50 % of the surface area of the layered product.

With regard to claim 8, for all of the reasons mentioned previously with regard to claim 1, the Examiner deems the limitations of this claim to be inherently present in the composite of Evans et al.

With regard to claim 11, the fibers may be carbon (col. 5, lines 8-19).

With regard to claim 12, the thermosetting resin may preferably be mainly composed of epoxy resin (col. 5, lines 20-23). The Examiner clearly envisages using epoxy resins as the main resin.

With regard to claim 13, the thermoplastic resins used may be the same as those claimed (col. 7, lines 48-53).

With regard to claims 16 and 17, the composite of Evans et al. may be used in the manner illustrated in Figure 4 and in Reexamination claims 1-3.

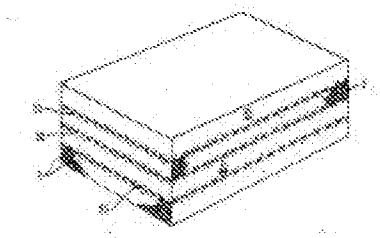

FIG. 4

This composite may have a plurality of the individual interleafed fiber resin matrix materials **24** of Figure 3 (see also Reexamination claims 1-3). Two of these composite materials bound to each other read on claims 16 and 17.

With regard to claims 19 and 20, these materials may be used as structural parts in airplanes (col. 1, lines 29-36 and col. 9, lines 47-52). Airplanes contain electronic apparatus, and therefore these materials being used on an airplane read on "a housing of an electric or electronic apparatus" as claimed.

Claim Rejections - 35 USC § 103

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Evans et al. (4,604,319).

Evans et al. teach broadly in their Reexamination claim 1 that a plurality of composites may be bound to one another; however, they do not specifically state that the thermoset layers may be bound and have the thermoplastic layers form opposing surfaces of the overall molded composite.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made composites having a layer structure of A-B-A-B or B-A-A-B depending upon the end use of the laminate. One of ordinary skill would know that this would be the two possible combinations contemplated by the Reexamination claim 1 of Evans et al. The rationale for having different outer layers is whether the outermost layer should possess the high tensile and flexural strength, which will be

imparted by the thermosetting resin, or have the thermoplastic resin layer as the outermost layers, which will provide an adhesive layer to attach to other objects.

Response to Arguments

9. Applicant's arguments, see Remarks, filed 10/22/2010, with respect to the objections to the specification and the rejection of claims 1, 3, 5-8, 11-13, 16, 17, and 19 under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The relevant objections/rejections have been withdrawn.

The Examiner notes that two options have been presented with regard to the language of claim 39 in order to overcome the last rejection with regard to part (g). See section 4 above.

10. The Declaration under 37 CFR 1.132 filed 10/22/2010 is sufficient to overcome the rejection of claims 1, 3, 5-8, 11-13, and 39 under 35 USC 103(a) based upon Obara in view of Nishimura et al. as well as any dependent rejections thereon.

However, given the admissions applicants have provided concerning Comparative Example 2 in Obara, there is sufficient evidence to reject claims 1, 3, 5, 6, 8, 11-13, and 39 under 35 USC 102(b) as being anticipated by Obara. See section 6 above.

11. Applicant's arguments filed 10/22/2010 have been fully considered but they are not persuasive.

Applicants argue that there is not sufficient evidence in Evans et al. to provide for anticipation of the continuous rugged interface of the claimed invention particularly considering col. 3, lines 46-54 of Evans et al.

The Examiner respectfully disagrees and notes that Evans et al. state that there "may be an extremely thin layer…where the thermoplastic interleaf material dissolves slightly;" however, this does not say there always is this thin dissolved layer. Additionally, given the fact that Evans et al. teach the same preferential materials and a process of manufacture that is substantially similar to applicants, there is enough evidence for the Examiner's *prima facie* case of inherency for the continuous rugged interface. Applicants' have not provided evidence that would overcome this *prima facie* case.

Applicants argue at page 26 of their Remarks that Evans et al. do not melt their thermoplastic resin during the formation of the composite, and therefore because of this fact, Evans et al. would not form the layered product of claims 1 and 39.

The Examiner first notes that applicants appear to be arguing limitations (i.e., "the thermoplastic resin must be melted to produce the layered product") that are not in the claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Second, the Examiner would respectfully disagree that melting must necessarily take place to form the layered product. At page 36, lines 3-16 in applicants' specification, they state that the thermoplastic resin needs to be "molten or softened at

the temperature at which the thermosetting resin is set". Softening would represent a lower temperature than melting.

Applicants then argue at pages 26-27 of their Remarks that the materials of Evans et al. could not satisfy the disclosed requirement of the thermoplastic needing to be melted during processing.

The Examiner respectfully disagrees for at least the reason that polyester, polyamide, and polycarbonate disclosed by Evans et al. at col. 7, lines 48-51 are also disclosed by applicants' in their specification at page 35, lines 12-20 as being appropriate for their thermoplastic resin layer. Given the fact that these materials are the same as those preferentially disclosed, it is clear these materials could become softened or molten during processing. It is noted that polyester, polyamide (e.g. Nylon 6), and polycarbonate have glass transition temperatures of 69, 50, and 150 °C, respectively. If the process at col. 9, lines 27-28 of Evans et al. is used, i.e. 180 °C that would be above the glass transition temperatures of the resins mentioned above; hence, those resins would be softened and flowable.

Applicants argue on page 29 of their Remarks that the obviousness rejection using Evans et al. is inappropriate because temperature and pressure are not result-effective variables.

The Examiner notes that the rejection set forth above suggest that the temperature and pressure conditions should be optimized to allow the fiber to penetrate to any depth including 10 microns or more as claimed. The rationale is that one of ordinary skill would want the fiber to be in as much of the thermoplastic layer in order to

lead to a laminate would exhibit the best properties, e.g. shear modulus, bonding strength, compression strength, etc., while not have the fibers being exposed on the surface of the thermoplastic layer.

With regard to the col. 7, line 63 to col. 8, line 2 of Evans et al., the Examiner again notes that this is an optional addition of fibers to the thermoplastic layer; furthermore, this supports the Examiner's position that having the fibers in the thermoplastic layer would add additional support. It is also noted that the reinforcing materials mentioned at col. 7, line 63 to col. 8, line 2 of Evans et al. are not the long fibers of the thermoset prepreg, and therefore they would not necessarily provide the beneficial properties mentioned above. The Examiner maintains that one of ordinary skill would know to optimize temperature and pressure conditions.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GERARD T. HIGGINS whose telephone number is (571)270-3467. The examiner can normally be reached on M-F 10am-8pm est. (Variable one work-at-home day).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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